anisamic acids has likewise furnished new bodies, with the study of which I am at present engaged.

Action of Nitrous Acid on Phenylamine and Nitrophenylamine.

Phenylamine, when submitted to the modified nitrous acid-process, is transformed into a fusible body containing

$$C_{24}H_{11}N_3,$$

which is insoluble in water and easily soluble in alcohol. This compound, which possesses feebly basic characters, is formed according to the equation

$$\underbrace{C_{24}H_{14}N_2}_{\text{2 equivs. of Phenylamine.}}+NO_3=3HO+\underbrace{C_{24}H_{11}N_3}_{\text{New compound.}}.$$

Nitrophenylamine (the alpha-variety which is formed by the action of reducing agents upon dinitrobenzol), similarly treated, furnishes a compound crystallizing in beautifully red needles

$$C_{24}H_9N_5O_8$$

the formation of which is represented by the equation

$$\underbrace{C_{24}H_{12}N_4O_8}_{\text{2 equivs. of Nitrophenylamine.}}+NO_3=3HO+\underbrace{C_{24}H_9N_5O_8}_{\text{New compound.}},$$

Treated with concentrated hydrochloric acid, the new compound reproduces nitrophenylamine. The action of chlorine and bromine upon it gives rise to the formation of new crystallized derivatives.

VI. "On the Influence of the Ocean on the Plumb-line in India." By the Rev. J. H. Pratt, Archdeacon of Calcutta. Communicated by Professor Stokes, Sec. R.S. Received December 7, 1858.

(Abstract.)

This paper is a sequel to two former communications made to the Royal Society by the author. In the first of these (communicated in 1855), the deflection of the plumb-line caused by the mountain-mass north of Hindostan is calculated; and in the second (communicated in 1858), the effect of a small excess or defect of density pre-

vailing through extensive parts of the earth's mass, is found, with a view to determine whether any compensating cause can possibly exist below to counteract the large amount of deflection caused by the superficial mass lying above the sea-level. A survey of the causes of disturbance of the plumb-line cannot be complete without taking into consideration the influence of the ocean. To approximate to this is the object of the present paper.

The author first adverts to the peculiar geographical position of Hindostan. The highest mountain-ground in the world lies to the north of it; and an unbroken expanse of ocean extends from its shores down to the neighbourhood of the South Pole. The excess of matter presented by the first causes a deflection of the plumb-line towards the north, decreasing in amount as we travel southwards. The deficiency of matter arising from the second causes a deflection of the plumb-line also towards the north, but decreasing in amount as we travel northwards. The consequence is, that while these two causes conspire to increase the deflection at the different stations, the action of the second tends to reduce in amount the errors which the mountain-attraction causes in the amplitudes.

But the attraction of the mountains northwards, and the deficiency of attraction of the ocean southwards—which last is, in fact, equivalent to a repulsive force northwards—combine to produce another effect upon the measures of the survey besides the deflection of the plumb-line. They have a sensible influence in changing the sea-level, so as to make the level at Karachi, near the mouth of the Indus—to which a great longitudinal chain of triangles is brought down from Kalianpur, in the centre of India—many feet higher than the level at Punnæ near Cape Comorin, the south extremity of the great arc. In other words, the level at Karachi is many feet higher than it would be at that place, if, while the level at Punnæ remained unchanged, the disturbing attractions were removed.

The author then proceeds with the details of the calculation, which is conducted by the method of his former papers. In our ignorance of the form of the bed of the ocean, especially in a part of the world where but few soundings have been taken, it is of course necessary to make some assumption respecting the depth of the ocean and the form of its bed. The author assumes a law as to the variation of depth, which, while it is probably a pretty fair representation of

the actual state of things on the average, permits of calculation without too much labour. The expression of this law involves three arbitrary constants, representing depths at particular places, of which the various deflections are linear functions. He next calculates numerically the coefficients of the arbitrary constants in the expressions for the various deflections, and then proceeds, guided by the probabilities of the case, to make further assumptions as to the ratios of two of these constants to the third; and lastly, as to the numerical value of the remaining constant. The general character of the assumptions is, that at a point 36° south of Cape Comorin, and in the meridian of the measured arc, the depth is assumed to be three miles, and the bottom is supposed to slope down towards this point according to a certain law.

The following are the deflections obtained at the various stations. The fifth station (called Near-Goa) is a point half-way between Punnæ and Karachi:—

At Kaliana....	deflection North	6″·18	deflection East	0″·09
,, Kalianpur..	,,	9 ·00	,,	0 ·48
,, Damargida..	,,	10 ·44	,,	1 ·80
,, Punnæ....	,,	19 ·71	,,	2 ·19
,, Near-Goa..	,,	13 ·83	,,	2 ·79
,, Karachi ..	,,	9 ·99	,, West	1 ·26

The author then proceeds to correct the ellipticity, as deduced from the Indian arc, for the defect of ocean as well as the excess of mountain attraction, and obtains—

$$\text{Corrected ellipticity} = 0{\cdot}003614 = \frac{1}{276{\cdot}7},$$

which is nearer the mean ellipticity than was the value obtained by correcting for mountain-attraction alone.

He then proceeds to calculate the rise of the sea-level at Karachi above that at Cape Comorin, and obtains—

From the defect of ocean attraction......	448·25 feet.
From the excess of mountain attraction ..	66·32 ,,
Total..................	514·57.